



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,425	07/02/2003	Hung-Kee Kim	45370	2584

7590 09/28/2006

Peter L. Kendall  
Roylance, Abrams, Berdo & Goodman, L.L.P.  
Suite 600  
1300 19th Street, N.W.  
Washington, DC 20036

EXAMINER

ZISKIND, ANNA Y

ART UNIT PAPER NUMBER

2611

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

<b>Office Action Summary</b>	<b>Application No.</b> 10/611,425	<b>Applicant(s)</b> KIM ET AL.	
	<b>Examiner</b> Anna Ziskind	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 7/2/03.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/24/04, 1/31/06, 6/30/06</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

### ***Information Disclosure Statement***

The information disclosure statements (IDS) submitted on 6/24/04, 1/31/06, and 6/30/06 were considered and made of record by the examiner.

### ***Drawings***

The drawings are objected to because, in Figure 6, the arrow between the transmit antenna diversity decoder (reference 103) and the speed estimation/transmit antenna diversity determination (reference 110) should be pointing from the determination unit to the decoder, not the other way. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Claims 7 and 15 are objected to because of the following informalities: the description of the summer/summing implies that all of the weighted channel signals are being summed together, when in fact Figure 4 shows that the channel signals are summed with a corresponding pilot signal individually. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that

the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6892059 (Kim et al.) in view of US Patent Application Publication 2002/0009156 (Hottinen et al.).

As to claims 1 and 9, Kim teaches a transmit antenna diversity system which involves communication between a mobile station, or user equipment, and a base station, or Node B, which includes several antennas (Fig. 1). The mobile station measures the changed amount per unit time of the phase difference between the received signals from the multiple transmitting antennas at the base station (Fig. 2, reference 200; Col. 3, lines 26-32, 40-47, and 56-61). The calculation of the phase difference between the received signals of transmitting antennas is an estimation of the channel response. The calculation of the changed amount per unit time of this difference is an estimation of a variation speed of the channel response. Next, Kim teaches transmitting the results of the variation speed measurement as feedback information to the base

station for adjusting transmitting antenna diversity (Col. 3, lines 48-50). Instead of selecting an antenna diversity scheme and transmitting the selected scheme, the invention of Kim simply transmits the measured variation speed, which is then used by the base station to make the necessary adjustments to the antenna diversity. Kim also doesn't teach that one of the antenna diversity schemes to be used is space time transmit diversity (STTD). Hottinen teaches a transmit diversity system that switches between diversity schemes that are selected at the mobile station and sent back to the base station as feedback (Fig. 2; Pg. 1, ¶0008-0010). Further, Hottinen teaches the use of STTD as one of the diversity schemes (Pg. 7, ¶0104). Therefore, it would have been obvious to one of ordinary skill in the art to make slight changes to the design taught by Kim, including diversity scheme selection at the mobile station, transmission of the selected scheme as feedback to the base station, and the use of STTD as a possible diversity scheme. Diversity scheme selection at the mobile station allows both stations to know which scheme will be in use. The use of STTD provides an enhanced robustness against erroneous signaling (Hottinen, Pg. 7, ¶0104) and adds flexibility to the communication system by allowing use of STTD when channel conditions are appropriate.

As to claims 2 and 10, Kim doesn't teach calculating an autocorrelation value of the channel response and estimating a speed value from the autocorrelation value. Hottinen teaches a relationship between the speed of

channel changes and the autocorrelation of the channel response (Pg. 3, ¶0042, 1<sup>st</sup> sentence). Therefore, it would have been obvious to one of ordinary skill in the art to use the autocorrelation of the channel response to estimate the speed of change of the channel. Doing so would provide a more accurate channel response change speed than the change in phase difference between antennas, which only tracks the temporal effects of the channel, not the gain effects.

As to claims 3, 6, 11, and 14, Kim teaches determining weights at the base station, based on the received feedback information (Col. 3, lines 51-53). Hottinen teaches that, for TXAA diversity schemes, feedback signaling involves sending the weights to be used with the schemes (Pg. 1, ¶0011, 0012; Pg. 2, ¶0015, 0016). It would have been obvious to one of ordinary skill in the art to include weight calculations in the feedback information sent from the mobile station in the design taught by Kim. Doing so would ensure that the base station is sending signals that would have optimum coherence upon reception at the mobile station.

As to claims 4 and 12, Kim teaches that the channel received at the mobile station for channel response estimation is a pilot channel (Col. 4, lines 50-52; Col. 5, lines 1-3).

As to claims 5 and 13, Kim teaches a base station which receives the feedback information from the mobile station regarding the variation speed of

the channel, determines a transmit antenna diversity adjustment, and transmits channel signals according to this adjustment (Col. 4, lines 39-60). However, Kim doesn't teach determining a different diversity scheme according to the feedback information, nor does Kim teach that one of the possible diversity schemes is STTD. Hottinen teaches selecting an antenna diversity scheme at the base station depending on the received feedback information from the mobile station (Fig. 2; Pg. 1, ¶0008-0010). Hottinen also teaches the use of STTD as a possible diversity scheme (Pg. 7, ¶0104). Therefore, it would have been obvious to one of ordinary skill in the art to make slight changes to the design taught by Kim, including diversity scheme switching at the base station and the use of STTD as a possible diversity scheme. Diversity scheme switching at the base station follows the information sent from the mobile station and thereby ensures both stations are aware of the scheme being used. The use of STTD provides an enhanced robustness against erroneous signaling (Hottinen, Pg. 7, ¶0104) and adds flexibility to the communication system by allowing use of STTD when channel conditions are appropriate.

As to claims 7 and 15, Kim teaches summing the channel signals with a pilot signal before transmission from their corresponding antennas (Fig. 1, references 160 and 170; Col. 2, lines 35-37). However, Kim doesn't explicitly teach encoding the channel signals according to the determined diversity scheme and multiplying the encoded channel signals by a weight. Hottinen



teaches the implementation of STTD by first encoding channel signals and then applying weights associated with each channel (Pg. 7, ¶10104). Therefore, it would have been obvious to one of ordinary skill in the art to include a converter to encode and a multiplier to apply weights to outgoing channel signals. In a transmission system that implements STTD, these operations are necessary to properly format the channel signals for transmission.

As to claims 8 and 16, Kim doesn't teach that the feedback channel is a dedicated physical control channel. Hottinen teaches that the feedback channel is a channel dedicated to providing antenna diversity decisions from the mobile station to the base station (Pg. 1, ¶10008-0009). Therefore, it would have been obvious to one of ordinary skill in the art to use a similar channel for the feedback signal taught in Kim's invention. A dedicated channel adds efficiency to the system by allowing both the mobile and base stations to communicate with minimal delay.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Ziskind whose telephone number is (571) 272-2769. The examiner can normally be reached on Mon. - Fri., 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anna Ziskind  
Examiner  
Art Unit 2611



CHIEH M. FAN  
SUPERVISORY PATENT EXAMINER